ABSTRACT OF THE DISCLOSURE

~~METHOD FOR REDUCING BIAS ERROR IN A VIBRATING STRUCTURE GYROSCOPE~~

A method for reducing bias error in a Vibrating Structure Gyroscope having a vibrating structure, a [[(1),]] primary drive ~~means (2),~~ for putting the vibrating structure [[(1)]] into carrier mode resonance, a primary pick-off ~~means (3)~~ device for sensing carrier mode motion, a secondary pick-off ~~means (10)~~ for sensing response mode vibration of the vibrating structure [[(1)]] in response to applied rotation rate, a secondary drive ~~means (16)~~ for applying a force to control the response mode motion, closed loop primary control loops for maintaining a fixed amplitude of motion at the primary pick-off device, ~~means (3)~~ for maintaining the drive frequency at the resonance maximum, and secondary control loops for maintaining a null at the secondary pick-off device. ~~means (10)~~. In the method the ratio SF_{QUAD} over $SF_{IN\text{-}PHASE}$ is measured from the secondary control loop to provide a direct measurement of Sin ($\phi_{SD} + \phi_{PPO}$), according to the relationship $SF_{QUAD} = SF_{IN\text{-}PHASE} \times \text{Sin}\ (\phi_{SD} + \phi_{PPO})$ where SF_{QUAD} is the quadrature scalefactor $SF_{IN\text{-}PHASE}$ is the in-phase scalefactor, ϕ_{SD} is the phase error in the secondary drive [[means]] and ϕ_{PPO} is the phase error in the primary pick-off ~~means.~~ device. The total phase error ϕ_E is obtained directly from the measured Sin ($\phi_{SD} + \phi_{PPO}$) according to the relationship; $\phi_E = \phi_{SD} + \phi_{PPO}$ and phase corrections applied to the secondary drive ~~means (16)~~ and/or primary pick-off ~~means (3)~~ device to reduce the phase error ϕ_E, and hence the quadrature bias error, to enhance the performance of the gyroscope.